Municipal Wastewater Privatization:

An Alternative with Solutions for Infrastructure Development, Environmental Compliance, and Improved Efficiency

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Subj: FEEDBACK ON QUALITY OF EDUCATION

Ref: (a) NAVPGSCOLINST 1520.1D

Encl: (1) Masters Project (Two Copies)

1. Per reference (a), the following information is provided concerning the quality of graduate education at civilian universities:

University: Old Dominion University
Degree: Master of Engineering, Environmental Engineering
Subspecialty: 1101P
Date commenced full-time studies: August 1997
Actual graduation date: August 1998

2. Academic Accomplishments:

I have just completed all degree requirements. My overall GPA is ~~3.93~~. 3.89

3. Strengths and Weaknesses of Program:

The overall academic experience has been challenging and rewarding, and I feel that I have received a sound technical education. The Environmental Engineering program at ODU has some outstanding classes and professors, and some that are sub-par. In particular, the Civil Engineering Project Management class, and the Solid Waste class were less than optimal due to the performance of the professors. The administrative support was less than desirable. I had to personally intervene every semester to clear up the contract payment procedures for my tuition. In addition, the NROTC Unit support and interest for DUINS students was minimal.

4. Enclosure (1) is provided as indicated in student handbook.

5. My next tour of duty will be as the Public Works Officer at NCTS Cutler, ME. My forwarding address is:

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Very respectfully,

R. F. WAKEMAN

Abstract

Municipalities with wastewater operations face increasing requirements to maximize efficiency, implement capital improvements, and ensure environmental compliance. Privatization is a relatively unused alternative offering benefits in the areas of cost-effective operation, flexible financing, technology access, and compliance assurance. Recent executive direction and tax code changes have opened new doors for mutually beneficial public-private partnerships. Wastewater privatization has historically consisted of short-term contract agreements for treatment operations, but looming infrastructure recapitalization and development requirements have catalyzed an exploration of non-traditional alternatives that include private sector financing, development, and operation of entire wastewater systems. The purpose of this paper is to show why privatization must be considered, evaluate the different levels available, and generate an analytical aid for communities taking their first look at privatization opportunities. Two case-studies are presented as ground-breaking examples of success in wastewater privatization.

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Introduction

Municipalities in the United States are at a crossroads of decision-making in regards to the future management of wastewater operations. Increasingly stringent compliance requirements, coupled with the need for infrastructure upgrade, rehabilitation, and expansion, have led municipalities to the exploration of alternative sources of service delivery and capital financing. The need to maximize efficiency, minimize cost, and implement capital improvements are the three elements behind this exploration.

Traditionally, wastewater systems have been an object of public monopolization in the United States. Eighty percent of waste water treatment plants in the U.S. are publicly owned and operated, and ninety-eight percent of wastewater revenues are generated by municipality owned collection and treatment systems.[1] While there are historical reasons for this lop-sided proportionality, municipalities struggling with financial burdens and compliance requirements should now consider public-private solutions to their wastewater needs.

Wastewater privatization has significant potential benefits in the areas of cost-effective development and operation, flexible financing, technology access, and compliance assurance. These benefits, along with recent changes in legislation and Internal Revenue Service (IRS) regulations, leads to the conclusion that privatization must be considered as a viable option for all public agencies engaged in wastewater operations. This does not mean that privatization will be chosen in all instances, but the internal review process required for privatization analysis will at minimum provide

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1 Lisk, Ian, ed. "Privatization Hindered by Tax Policies and Other Factors," http://www.wateronline.com/literature/industrynews/ind6041801.html.

targets for organizational reengineering, and at the most extreme lead to complete privatization.

The intent of this paper is to show why privatization must be considered for municipal wastewater operations, and to explore the types and levels of privatization available. The historical focus of wastewater privatization has been on contract operation of treatment facilities. Rather than focusing solely on wastewater treatment, the entire process of collection, treatment, and disposal will be examined relative to privatization opportunities. Because of the estimated $120 billion needed for wastewater infrastructure construction, upgrade, and improvement over the next twenty years, particular emphasis will be placed on non-traditional public-private partnerships which are effective in meeting the need for capital improvement and development. In addition to an examination of recent changes in legislation and regulations, additional possibilities for "leveling the playing field" between public and private entities will be discussed. Case-studies involving Franklin, Ohio and Cranston, Rhode Island are presented as ground-breaking examples of privatization success. In addition, an analytical aid for preliminary evaluation of privatization alternatives is presented.

What is Privatization?

Privatization is typically thought of as the outsourcing of a government controlled service by way of a private contract. These or public services are normally associated with some particular level of government, whether it be federal (e.g. national defense), state (e.g. highways), or local (e.g. wastewater collection and treatment). Throughout the history of the United States certain services and functions have become inherently tied to public responsibility. In the early 1980's, the possibility of privatization became popular in regards to many traditionally public services, emphasizing a theory based on savings and quality. Garbage collection and transportation were two areas in which privatization efforts were implemented, with varying levels of success.

Privatization in the wastewater industry is comprised of much more than service contracts. There are several different levels of privatization involving public-private arrangements, varying from contract services of a particular function all the way to complete divestiture of assets. While all different levels are discussed, the particular emphasis of this paper is on the opportunities for asset sales, franchising, and long-term leasing.

What are Municipal Wastewater Operations?

Wastewater operations have three primary components; collection, treatment, and solids disposal. Collection systems collect and transport wastewater from households, industries, and combined sewer overflows. (In areas of heavy industrial activity there are often separate wastewater facilities for industrial collection and treatment. In locations where there are combined municipal and industrial services, there is often a requirement for industrial pretreatment by the wastewater generator.) The collection systems are comprised of gravity and pressure piping, and

appurtenances such as manholes and pump stations. Average wastewater flows in the United States are typically generated at a rate of 165 gallons per day per person.[2] Treatment systems are usually in the form of a wastewater treatment plant which combines several sequential processes to provide an effluent water which meets discharge requirements in regards to pollutants, nutrients, and other compounds. Solids disposal is comprised of the process of collecting, treating, and disposing of the solid material (sludge) generated as part of the treatment process. It should be noted that many communities, particularly in rural areas, have wide-spread use of on-site wastewater collection and treatment systems. Efforts to improve technology and increase focus in this area will have future benefits for this type of application. On-site systems have traditionally been designed, installed, and maintained by the private sector, and are therefore not considered as part of this study.

While seemingly apparent, it is important to define the primary performance measures used in the area of wastewater operations. The two primary indicators are 1) unit cost of service; and 2) compliance with discharge requirements. The first one can be seen directly in the rates passed on to the taxpayers. The second can be measured by the number of violations of the National Pollutant Discharge Elimination System (NPDES). Under this system, wastewater operators must apply for discharge permits, and are regularly tested and regulated for levels of pollutants in discharge from treatment plants.

Why is Privatization Being Considered for Wastewater Operations?

Cash-strapped municipalities are desperate for solutions. Especially in an climate of elected officials, quick results are desired. Many local governments are

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2 Metcalf & Eddy, Inc., *Wastewater Engineering - Treatment, Disposal, and Reuse.* New York: McGraw-Hill Inc., 1991, p.17.

seeking alternatives out of economic necessity. Communities in need of funds for debt repayment, general tax relief, and capital improvements can look to privatization as an opportunity to obtain funds quickly while avoiding the long-term debt service requirements of municipal bonds. Other communities overwhelmed with the complexity of changing compliance requirements can choose to turn responsibility over to a private entity more proficient in understanding and achieving compliance requirements.

There are some unique characteristics of wastewater utility services which must be considered when evaluating the question of privatization. In the normal free-market society, the provider who meets the requirements for goods and services at the lowest cost will be selected. Wastewater utilities are unique in that they deliver a public good called environmental quality. Because of higher fixed costs and economies of scale there is usually only one provider of these services in a community. Table 1 shows the capital intensive nature of water systems (water and wastewater) compared to other utilities.

Table 1: Utility Asset Requirement Per Dollar of Revenue

Utility	Asset $/Revenue$
Water Systems	10-12
Telephone Utilities	3
Electric Utilities	3-4

Source: David Haarmeyer, "Privatizing Infrastructure: Options for Municipal Water-Supply Systems," Policy Study No. 151, Los Angeles: Reason Foundation, October 1992.

The result is that a natural monopoly exists, and there is no natural competition that drives providers to efficiency and lower cost. Therefore, another reason that wastewater operations are being considered for privatization is that competitive conditions are seen as an avenue for ensuring that ratepayers obtain efficiency, quality, and lowest reasonable cost.

Most importantly, certain types of privatization offer possibilities for fulfillment of capital improvement and development requirements that are not available under traditional municipal financing arrangements. These requirements and opportunities will be presented in subsequent discussions.

Background on Wastewater Infrastructure

An understanding of the background of wastewater infrastructure is helpful in understanding the situations faced by municipalities today. In 1972 Congress passed the Federal Water Pollution Control Act (FWPCA) due to public outrage over the condition of water-ways in America. The FWPCA was amended in 1977 and the name changed to the Clean Water Act (CWA). Environmental pollution was largely the result of only forty-two percent of the population having secondary sewage treatment, combined with uncontrolled discharges from industrial sources. Largely due to a massive cash infusion from the federal government, this percentage nearly doubled over the next twenty-five years. According to estimates by the Environmental Protection Agency (EPA), over $67 billion of federal funds have been put into wastewater systems since 1972.[3] During that time, municipalities were on the receiving end of generous aid, with the federal government providing 75% of the cost of system construction, the state government 15%, and local governments only 10%. This money allocated brought significant results, with the percentage of Americans served by secondary wastewater treatment nearly doubling. Also during this time span the percentage of lakes and rivers considered safe for swimming increased from forty to sixty percent.[4] This era of free-flowing money will certainly not be repeated now, though there are tremendous needs.

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3 Wright, Andrew G. "Still Room to Improve," *Engineering News Record*, October 20, 1997, p.26.

4 *Ibid.*

Future Wastewater Infrastructure Requirements

Many of the systems put in place over the last twenty-five years need upgrades, repairs, or expansions. In addition, more stringent discharge and treatment requirements are requiring the use of new technology to meet the standards. Population growth also contributes to the need for new or expanded wastewater facilities. In a September 1997 report to Congress, the EPA estimated that over $120 billion dollars will be required for wastewater infrastructure over the next twenty years. Because of the heavy emphasis over the last twenty-five years on treatment plants, the majority of infrastructure requirements (over 60 %) are in the area of collection and combined sewer overflow (CSO) facilities (see Table 2). [5] This impending tidal wave of requirements has led to the search for alternative sources for meeting compliance, cost, efficiency, and capital outlay needs.

Table 2: U.S. Wastewater Infrastructure Needs for the Next 20 Years ($billion)

Secondary Treatment	26.5
Advanced Treatment	17.5
Infiltration Correction	3.3
Sewer Replace/Rehab	7.0
New Collector/Interceptor Sewers	21.6
Combined Sewer Overflow	44.7
Total	120.6

Source: Data from EPA, cited in Wright (October 20, 1997), p.30.

Public vs. Private: Who is Responsible for Environmental Quality and Pollution Control?

The evolving federal, state, and local government involvement in environmental protection and water pollution prevention over the past eighty-five years has indelibly etched the notion in the minds of the American people that the

5 *Ibid*, p.30.

responsibility for the provision of environmental quality lies with public agencies. This stems primarily from the regional nature of water pollution prevention and the need to protect public health. For many people, responsibility also means service performance, and service performance means ownership. In regards to the wastewater industry, the options in privatization can allow responsibility without necessarily requiring service performance and even ownership. In many countries (both developed and developing), environmental infrastructure has long been turned over to investor-owned corporations, to the extent that public agencies do not even maintain control. Monitoring the climate of public opinion in the United States shows the expectation of maintaining some sort of public control over environmental quality, but the capitalistic motivation of our society also embraces the use of for-profit private companies in whatever industry possible. These two conflicting ideals can meet due to the available levels of wastewater privatization, which allow for the level of control desired by a municipality, but also allow the reaping of benefits related to flexible capital financing, user rate control, and environmental compliance. In time however, the paradigm of government control and ownership needs to shift to public-private partnerships.

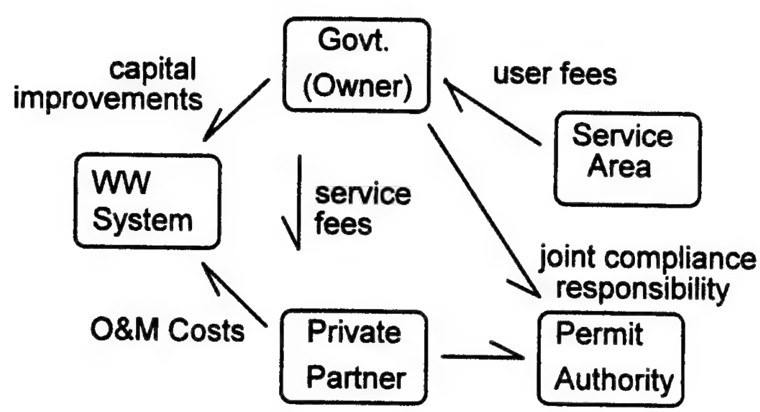
Definitions of Types and Levels of Privatization

In regards to wastewater systems, privatization comes in four major forms: contractual privatization, asset sales, development franchises, and long-term leases. Nomenclature can vary regionally and institutionally, but the functional aspects are the same. Summary definitions of the types are provided as follows.

Contractual Privatization

This is the private contract operation of publicly owned facilities, commonly referred to as Operation, Maintenance, and Management (OM&M).[6] The assets are maintained by the public entity, but operations are performed under competitively procured service contracts. The scope of these contracts can range from all aspects of the operation to certain portions of the process. The competitive process and contract terms will depend on local procurement requirements, complexity of the system, and other factors.[7] Contracting for portions of wastewater operations has been on-going for decades. Primarily the services contracted out have been non-core functions such as billing and building maintenance. Local governments have used contractual privatization to obtain specified services for a limited time period, or as a way of obtaining specialized services to address a specific problem, and as a way to ensure competition in a traditionally government run service area. The focus now is on including the core functions of collection and treatment. Figure 1 displays the typical interaction in a contractual privatization agreement.

Figure 1 - Contract Operations



Original Source: EPA (content and format modified - same for Figs. 2-4)

6 Hersch, Paul, ed., "Contract OM&M: A Successful Alternative (Part 1)," http://news.pollutiononline.com/feature-articles/fa040897.html.

7 Association of Metropolitan Sewerage Agencies, *Evaluating Privatization - An AMSA Checklist*, Washington, DC: 1996, p.5.

A variation of contract operations is the turnkey contract. In this situation the private company designs, constructs, and operates the facility or system, but the government maintains the ownership and financing requirement.[8]

Contractual privatization is used primarily for the shifting of operation and maintenance to the private sector. The next two options provide opportunities where the responsibility for financing, owning, and operating infrastructure can be shifted from public to private.

<u>Asset Sales</u>

This is the private ownership and operation of the wastewater system. It involves the divestiture of assets and operational responsibility to a private entity. The Tax Reform Act of 1986 eliminated or reduced the benefits of private ownership. However, the issuance of Executive Order 12803 in 1992 provided increased incentive for asset sales, since it allowed for a way for the city to recover the its original investment first, and pay back the federal government only if proceeds from the sale remained.[9] As part of the transaction, the private firm and the government enter into a service contract where private entity is paid for the operation of the wastewater facilities. The private firm has control of the facility and can modify systems as desired to improve performance and cut costs. The divestiture usually occurs as either a government initial public offering of stocks, or as a competition where private firms submit bids for system purchase. Combinations of these two methods have also been used.[10] The only case so far in the United States where

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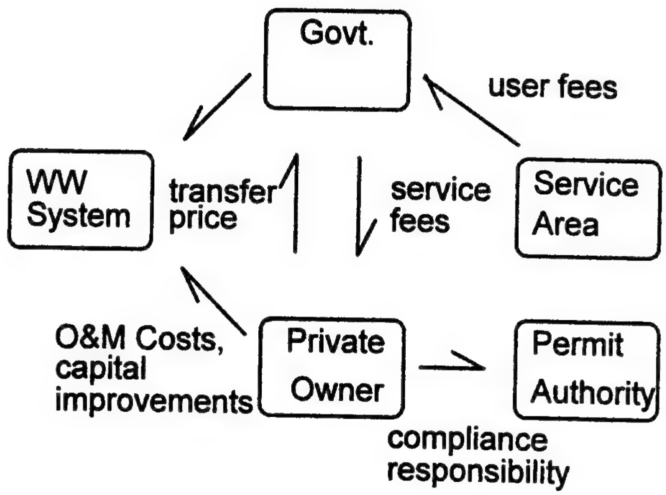
8 United States Environmental Protection Agency, *Public-Private Partnership Case Studies: Profiles of Success in Providing Environmental Services*, September 1990.

9 U.S. EPA, *Response to Congress on Privatization of Wastewater Facilities*, July 1997, p.4.

10 Poole, Robert W., "Revitalizing State and Local Infrastructure: Empowering Cities and States to Tap Private Capital and Rebuild America," Policy Study No. 190, Los Angeles: Reason Foundation, May 1995, p.6.

asset sale occurred was Franklin, Ohio. Details of this transaction are presented later. Figure 2 displays the typical interaction in asset sales privatization.

Figure 2 - Asset Sales

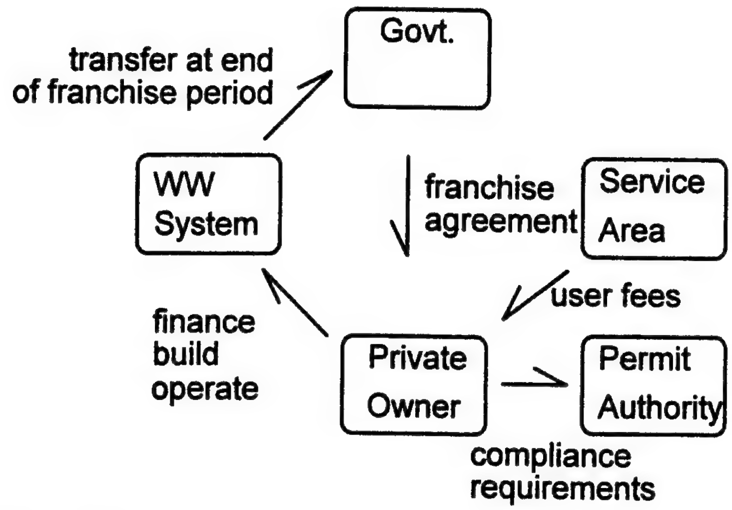


Development Franchises

A long-term development franchise is used in a situation where a public entity needs new infrastructure, but does not have the will or financing to develop, construct, and operate the needed system. The typical process is where a government defines its requirements and requests proposals on performance-based competitive criteria. The winner receives a franchise for a time period long enough to recover its investment, and retains the earnings of the facility until the end of the specified time period. At that point the system usually transferred back to the government. The common nomenclature attached to this type of agreement is Build-Operate-Transfer (BOT).[11] Figure 3 displays the typical interaction.

11 *Ibid*, p. 7,

Figure 3: Development Franchises

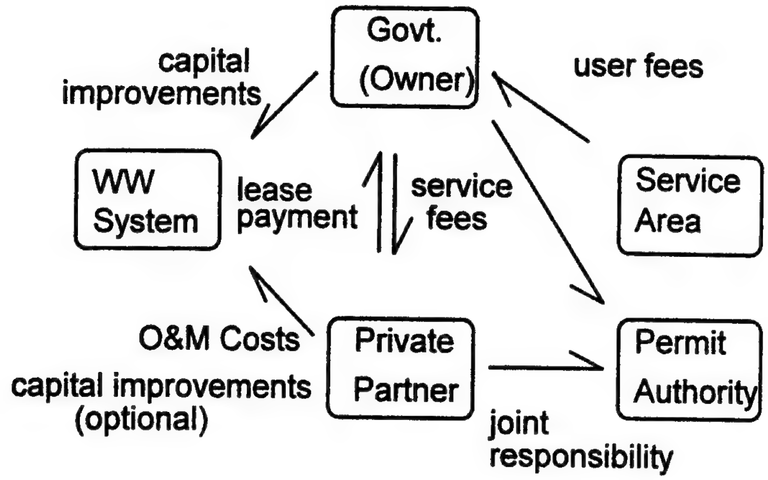


Long-term Capital Lease

This is similar to full asset privatization, except that the municipality or public entity retains control of the assets. In this situation the private firm will tender lease payments to the public entity in return for the rights to operate the assets and receive all revenues, or they may provide one up-front concession fee.[12] The private firm defeases any outstanding debt and, depending upon the arrangement may be dependent upon its own resources for capital improvement financing. Depending upon the state involved, rates are either regulated or set by bid. Figure 4 displays the typical interaction in a long-term lease.

12 U.S. EPA (July 1997), p. 10.

Figure 4: Long-Term Lease



The History of Wastewater Privatization Efforts

Interest in privatization of wastewater facilities increased as the tempo of wastewater infrastructure construction increased throughout the 1970's. With the booming nature of the industry, and the initial exploration of privatization going on in other traditionally public services, it was natural that this area be considered as well. Tax incentives for private investment were attractive in the early 1980's. These incentives centered around tax-exempt debt and tax-deductible interest payments and were the driving force behind increased momentum in the privatization of publicly owned treatment works (POTWs). These incentives were removed by the Tax Reform Act of 1986, and interest waned in the area of wastewater privatization. Renewed interest was generated in 1992 with issuance of Executive Order 12803, which was particularly favorable to municipal sales or leases of infrastructure constructed with tax-exempt financing, as was the case with most wastewater facilities. In addition, Executive Order 12893 directed public agencies to look for public-private partnership opportunities, and to remove barriers to privatization.[13]

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13 *Ibid*, p. 4

Privatization efforts to date have consisted primarily of contract operations. In the last ten years the number of contract operations for an entire wastewater facility has increased four times. Case study data shows most of these efforts were at relatively small treatment plants (flows of 1 to 10 MGD).[14] Contract operations remain an attractive alternative to municipalities considering privatization but wanting to maintain strict control, and it is expected that the use of this method will continue to rise. Alternate forms of privatization are just beginning to be exploited, with Cranston, RI (1997: long-term leasing), and Franklin, Ohio (1995: asset sales) as successful examples.

Comparison With the Water Industry

Another factor driving the look at privatization has been the successes of the water supply and treatment industry. Currently over forty-five percent of water revenues are generated by privately held water operators and consortiums.[15] Water and wastewater systems are similar in the existence of economies of scale, where there are lower unit costs at higher volumes, leading to natural monopolies. The primary difference is that the water industry delivers a consumable commodity (clean water), whereas the wastewater industry delivers a public good (environmental quality). Historically, consumer fees for water are based on individually quantified usage, where wastewater is based more on proportional billing. These differences aside, there are enough similarities to suggest that the successes experienced in the privatization of water facilities (treatment and distribution) can be realized in the wastewater industry (collection and treatment).

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14 Ibid, p.8.
15 Lisk ("Privatization Hindered by...").

The General Argument for Infrastructure Privatization

No more profound or simplified statement regarding infrastructure privatization can be found than that of then President Bush in Executive Order 12803, which states that, "Private enterprise and competitively driven improvements are the foundation of our Nation's economy and economic growth." The reasons for this perspective are defined by a summary statement from Lawrence J. Truitt and Michael Esler in *Public Works Administration - Current Public Policy Perspectives*. While the authors were specifically considering the airport industry, this statement applies to any service being considered for privatization. "In general, the main argument for privatization is efficiency. It is widely believed that the private sector is inherently more efficient than the public sector because private firms are better equipped and more motivated than their public counterparts to be cost and customer conscious. Of course the primary motivation for private enterprise is profits. Advocates argue that privatization leads to lower costs and improved productivity. The notion that managers driven by the profit motive continually improve the efficiency of operations has strong appeal to free-market economists and public-choice theorists. Advocates also argue that privatization results in improved strategic planning and decision-making processes that allow managers to seek and pursue new market opportunities."[16] The theme of this statement has been foremost in decisions for wastewater privatization by contract operations, and numerous case studies back up these claims. More efficient use of labor by private firms (as much as 40% workforce reduction) has been cited in many privatization efforts. In cases where contract operation is the only privatization option being considered it is possible for government agencies to re-engineer to the point of being competitive with private agencies. This possibility and process is expanded upon in later discussions.

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16 Brewer, Lucy, ed. *Public Works Administration - Current Public Policy Perspectives*. Thousand Oaks: Sage Publications, 1997, p.255.

Additional reasons for efficient resource management being less likely under government ownership are provided by World Bank economist John Nellis are as follows:

- *public enterprises are more subject to political interference than private firms;*
- *public enterprises are less capable of offering the right incentive and salaries to attract and retain good managers*
- *public enterprises are less subject to the discipline of commercial financial markets than private companies;*
- *the interests of capital are less well represented in public enterprises than private, that is, the owner of capital, the state, is represented by people who are not personally interested in profits and losses of the firm.*[17]

Beyond the argument for efficiency, there are other factors which favor infrastructure privatization efforts, and reveal government ownership and control as a less than optimum mode of operations. Economies of scale are developed when private firms are involved with infrastructure services in several geographic areas. Lessons learned, personnel expertise, and centralization of many functions contribute to lower overall costs. As succinctly described by economist John Donahue in the following statement, the incentive for innovation is minimal for government entities. He reasons that:

> "For a municipal agency, the potential payoff is limited to whatever lowers costs or higher quality can be achieved within the city limits. Except in the biggest cities, it seldom makes sense for public works departments to make large investments in innovation. A private contractor, however, can claim proprietary rights to innovations, diffuse new methods through its operations, and use technological advances as a competitive edge to expand its market."[18]

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17 Cited in: Haarmeyer, David, "Privatizing Infrastructure: Options for Municipal Water-Supply Systems," Policy Study No. 151, Los Angeles: Reason Foundation, October 1992, p.9.

18 Cited in: Stiefel, Holly June. "Municipal Wastewater Treatment: Privatization and Compliance," Policy Study No. 175, Los Angeles: Reason Foundation, February 1994, p.25.

Capital financing is an area where major obstacles to privatization remain, particularly in regards to tax-exempt debt. The details of these hindrances, and possible solutions will be discussed later. In spite of these obstacles, the private developer has advantages and techniques that can prove to be more cost-effective than government policies and procedures. The typical municipal capital improvement is financed by tax-exempt bonds, often well before actual construction takes place. Private developers normally fund the incremental development using "just-in-time" construction.[19] A shorter design and construction time implies quicker access to revenue from infrastructure user fees, and a shorter financing period. In addition, the municipal government costs of capitalized interest, bond insurance, and bond issuance can be avoided. It is important to note that even though tax-exempt financing carries lower interest rates, the overall amount financed by typical municipal methods could be greater than required by a private entity.

An often overlooked detriment to government ownership of infrastructure is the loss of tax-base to the local municipality.[20] Government owned facilities normally do not pay taxes, where a privately owned facility would be required to do so. An initial reaction to this fact could be the assertion that the cost of these taxes would be borne by the user. This is true, but on the other hand, the taxes paid by a privately owned enterprise are government revenues which may offset tax requirements in other areas.

Underpricing of infrastructure services is a reality in many government owned enterprises (especially evident in the area of water supply). Studies in public financial management quickly reveal that public governments do not account for depreciation of capital facilities in their financial statement calculations, where it is

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19 Poole (May 1995), p. 3.

20 *Ibid.*

accepted practice for private companies. This has led to government owned infrastructure setting rates at levels which cover operating requirements, but do not provide for infrastructure replacement needs. This fact, in combination with the high level of government subsidies designed to keep rates lower, has been instrumental in the infrastructure replacement crisis evident today. The long-term need for infrastructure replacement would be better served by private companies charging actual cost-of-service rates. This concept is hard to swallow at first since everyone is attracted to cost avoidance in the short term. Unfortunately, most American citizens have been spoiled by a high standard of living with a relatively low cost. In order to maintain this standard, we are going to have to begin to actually pay for what we get.

As a lead-in to the benefits of wastewater privatization, it is helpful to delineate key objectives. As defined by the European Organization for Economic Development (OECD) Proceedings, privatization objectives that translate to the wastewater industry are:

1. maximize the value obtained by the taxpayer;
2. improve competition, thereby leading to better quality services and lower prices for consumers:
3. improve the management of resources.[21]

Potential Benefits of Wastewater Privatization

As the leading government agency concerned with environmental protection and clean water, the EPA has taken the position that privatization or public-private partnerships are effective in the wastewater industry. Such a stance by this type of governmental agency indicates the need and potential for alternate solutions to wastewater infrastructure challenges. The EPA's position has been that "although public-private partnerships or privatization has been viewed by the EPA

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[21] Organization for Economic Cooperation and Development. "Privatization of Utilities and Infrastructure - Methods and Constraints,"*Proceedings*, Paris: OECD, 1997, p. 11.

predominately as an option to relieve the financial burdens of municipal plants, the agency also recognizes that privatization reduces costs, speeds project construction, guarantees proper performance, and preserves jobs."[22] In addition, the EPA touts five advantages of public-private partnerships as 1) access to more sophisticated technology; 2) cost-effective design, construction, and/or operation; 3) flexible financing; 4) clear delegation of responsibility and risk; and 5) guaranteed costs.[23]

The three areas of potential improvement due to privatization are environmental compliance, improved efficiency/lower cost, and cost-effective capital development. In the area of environmental compliance, trends show that environmental regulation tends to be more stringent when a private firm is overseen by a public agency. Assuming that regulations are provided for the best interests of public health and environmental protection, and from the perspective of the typical citizen, the operation and/or ownership of wastewater facilities by private firms would be a benefit in the area of compliance assurance. As shown in Figures 1 through 4, compliance responsibility is at least shared in all privatization scenarios, and often becomes the sole responsibility of the private provider. These scenarios avoid government monitoring of other government agencies, an arrangement that has the potential for political bargaining at the expense of compliance.

As stated earlier, improved efficiency and cost-savings, primarily due to contractual privatization has been widely achieved. Most of these savings were achieved due to increased efficiencies in labor, power, and material costs. These improvements have been well documented and optimized by resourceful private providers of wastewater services. Relatively unproven, but with tremendous potential is the escalation of wastewater privatization to the other levels previously defined.

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22 Stiefel (February 1994), cited in: Shannon, Sean P., Rethwisch, Kurt, and Wowyer, Jerry, "Privatizing Alcosan: Cutting Costs & Improving Wastewater Treatment Services in Allegheny County," Report No. 96-05, Pittsburgh: Allegheny Institute, May 1996, pp. 1-2.

23 *Ibid*, p.18.

Focus on Privatization in Capital Development

Due to the monumental requirement for wastewater infrastructure development, the EPA developed the Public-Private Partnerships Initiative in 1992. This was based on the conclusion that public funds provided by State Revolving Funds (SRF, which in 1987 replaced the Construction Grants Program of the seventies) would not be sufficient for meeting projected requirements.[24] This initiative was a result of studies showing future requirements previously documented in Table 2. It represented a shift in focus from the already proven area of privatized wastewater facility operations, to the need for privatization in meeting capital development and recapitalization requirements. This was a positive step since proponents of privatization feel that federal funding programs have stifled the innovativeness of local communities in regards to wastewater solutions. Dependence on federal grants worked as a disincentive to meeting discharge standards, since the absence of federal funding was allowed as an acceptable excuse for non-compliance. Placing incentive and responsibility in private hands allows for more innovative, performance-based solutions, and streamlines execution timetables.

Construction and Operation Issues

After studying wastewater privatization opportunities, Laurence J. O'Toole conclusively stated in his 1989 summary that:

> "Privatized design and construction of wastewater treatment facilities proceeded more smoothly, as perceived by participants, and much more quickly (by more than two years, on average) than in the grant-funded setting. Furthermore,... output measures of effluent quality and of compliance

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24 U.S. EPA (September 1990).

with regulatory standards showed that privatized facilities do not suffer by comparison with...counterparts."[25]

With the dollar value of infrastructure construction and upgrade needed, it is imperative that mistakes of the federally funded years not be repeated. The requirements of the federal Construction Grant Program led to significant and numerous design, construction, operation, and maintenance problems in federally funded facilities. The timeframe of the grant review process as well as a failure to assign accountability due to the large number of parties involved were factors in these problems. The EPA acknowledged the existence of facility failures by issuing its 1982 *Handbook: Identification and Correction of Typical Design Deficiencies at Municipal Wastewater Treatment Facilities*. In it, some of the problems identified were:

- inadequate process and operation flexibility;
- inadequate consideration of seasonal impacts on operating efficiency;
- inadequate estimation of present and future flows;
- inability to adjust and control process equipment;
- inadequate consideration of maintenance needs.[26]

While it is not reasonable to assume that private development will produce a zero-defect product, there are advantages to be gained for the next round of infrastructure development. Technology access, more defined accountability for performance, vastly reduced implementation times, and flexible financing options are advantages worth pursuing. Municipalities with significant infrastructure renewal or development requirements would do well to consider privatization opportunities where responsibility for capital improvements is part of the package.

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25 O'Toole, Laurence J., "Goal Multiplicity in the Implementation Setting: Subtle Impacts and the Case of Wastewater Treatment Plant Privatization," *Policy Studies Journal*, Vol. 18, 1989(a), pp. 10-11, cited in Stiefel (February 1994), p.19.

26 Stiefel (February 1994), p.15.

Alternate Sources of Capital

Municipalities across the United States are short of the capital needed for financing infrastructure requirements, and are frustrated with the conventional method of public bond issuance requiring the shouldering of long-term debt service obligations. One solution is to pursue public-private partnerships which utilize commercial debt and equity capital that has normally been invested in ventures other than infrastructure. Pension funds are a good example, since, not being taxable, higher yields can be achieved by investing in taxable debt.[27] Despite a non-level "playing field" between tax-exempt and taxable infrastructure bonds from the view of a municipality with either option, the chance to defer financing responsibility to a private developer has significant advantages to cash-strapped communities. Successes in these type of ventures have been experienced for toll roads and sports arenas, and through proper marketing can be translated to wastewater facilities.

Objections to Privatization

The rights of free speech and press in the United States have been greatly utilized in regards to the issue of privatization. Depending upon the perspective of the individual, convincing literature and case study data can be gathered to support or defend both sides of the pro/con argument. Wading through biased information is part of the objective review process. The point of this paper is not to radically state that privatization is devoid of pitfalls and the only suitable option for all municipalities; rather the purpose is to present privatization as an option with heretofore untapped potential for municipalities facing challenges in wastewater operations and infrastructure. In order to ensure a well-rounded perspective, objections must be examined and evaluated in regards to their legitimacy. Legitimate concerns must

27 Poole (May 1995), p.9.

then be placed on a theoretical risk/reward scale to evaluate the optimal course of action.

The intention here is to examine objections to privatization on a macro scale, summarized under issues of cost and issues of control. There is no doubt that some concerns and objections are valid, for which there is no legitimate rebuttal. For a micro-level review of potential problems related to wastewater privatization, the Association of Metropolitan Sewerage Agencies (AMSA) has prepared an outstanding guide called *Evaluating Privatization - An AMSA Checklist.* This reference outlines the issues which must be considered for different levels of privatization.

The Cost Objection

A universal assumption is that lower cost is good. Historically, the most prominent argument against privatization has been that private firms cannot compete with the public entities in terms of cost of service, because the public has no requirement to make a profit. With a private firm's requirements for advertising and taxes, in addition to the profit motive, the assumption is quickly made that the public option must be cheaper. The fundamental understanding missing in this argument is the role of the profit/loss incentive in determining what will be the actual production costs.[28] In the wastewater field, the introduction of competition as opposed to monopoly has been proven to have cost-saving results. As will be discussed later, reengineering efforts have in some cases made public entities competitive with private firms. However, the competitive environment has ensured that the lowest cost possible will be achieved, and in the majority of cases this has been achieved with a private firm.

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28 Poole, Robert W., Jr., "Objections to Privatization," Policy Review, Washington, DC: The Heritage Foundation, Spring 1983.

Another common argument is that the lower cost of privatization is only for the short term; that costs will go up once the privatizer has a "foot in the door." Contractual clauses and requirement to re-bid at periodic intervals are a simple, yet powerful answer to this concern. The use of privatization does not relieve a municipality of any responsibility; rather, it allows flexibility in responsibility allocation.

The Control Issue

Public management and execution of wastewater operations is a paradigm that will not shift easily. However, an objective evaluation has to consider the idea offered by Robert W. Poole, Jr. in stating that, "...we ought to raise a more fundamental question: why is local government providing a particular service in the first place?"[29] This question has to be answered by each municipality with wastewater facilities. The different levels of privatization available offer varying levels of control. Often the loss of control is a perceived notion that is not entirely accurate. This was reflected by Franklin, Ohio Public Works Director Sonny Lewis in observations about privatization by asset sales. He stated, "I guess the hardest thing for me was thinking we would lose control..[but]...when you think it through, we're not really losing control... at all, it's just another arm of the city."[30]

As inferred earlier, this is not meant to be an all-inclusive look at potential problems with privatization. It should however, point out that some of the basic objections are not as significant as the potential benefits.

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29 *Ibid*, p. 1.

30 Cited in: Oldewurtel, Keith. "Privatization and the Public Works Professional," *Public Works*, April 1998, p.34.

Removing Barriers to Privatization

Historical Perspective

Just as initiatives in privatization were gaining momentum in the early 1980's, the Tax Reform Act of 1986 put a barrier in the path of progress. The act removed or scaled back several incentives to private ownership. In particular, the ten-percent investment tax credit was removed, the use of rapid depreciation schedules was eliminated, and the availability of tax-exempt bonds to finance certain privatized facilities was removed.[31]

As mentioned earlier, the issuance of E.O. 12803 sparked renewed interest in privatization of wastewater facilities through sale or lease. It effectively removed the barrier of municipalities having to turn over proceeds to the federal government, and allowed for a recovering of local investment. This was a positive step so far taken advantage of only by Franklin, Ohio and Cranston, Rhode Island.

Revenue Procedure 93-17 reduced some of the restrictions of the 1986 Tax Act. Most notably it allowed for tax-exempt bonds to remain tax-exempt in the event of a sale or lease to a privatizer. It made it possible for municipalities to protect the tax exempt status of existing bonds through defeasance or by using sale (or lease) proceeds for furtherance of other capital development projects. While this was a positive step relating to existing bond circumstances, it did not address the more important issue of future development and bond issuance.

In the area of contractual privatization, the IRS removed significant barriers in January 1997 by the issuance of new regulations concerning contract length for OM&M contracts. While contract terms had been limited to five years (and were terminable by the public entity without cause after three years), new procedures allow terms of up to twenty years.[32] While certain criteria must be met, the opportunities

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31 Hersch, Paul, ed., "The Pros and cons of Buying and Selling Wastewater Treatment Plants," http://news.pollutiononline.com/feature-articles/psga1.html.

32 Herbst, Douglas, "How IRS Revisions for Management Contracts Will Affect Long-Term Public/Private Partnerships," http://news.publicworks.com/feature-articles/19971030-20.html.

are more attractive for private companies since there is more likelihood that a return on investment can be recovered with longer contracts. Innovation and capital improvement initiation are also more likely due to the implementation of these changes. An example where this new flexibility was put to use is the Department of Energy (DOE) Facility in Oak Ridge, Tennessee, where a ten-year utility management contract signed in March 1998 included wastewater collection and treatment.[33]

Remaining Barriers

The largest barrier to infrastructure privatization is the tax status of infrastructure bonds. While public agencies enjoy tax-exempt status, private sector firms must employ taxable bonds for capital financing. (There are exceptions to this when considering sale or lease of existing assets. The discrepancy pertains primarily to development of new systems.) There are two commonly discussed alternatives for equalizing the financing opportunities. The options are: 1) make all public purpose infrastructure bonds tax-exempt (Public Benefit Bonds), regardless of ownership; or 2) end tax-exemption status for infrastructure bonds in enterprises that are inherently self-supporting (through consumption or service fees). Simply stated, in order to "level the playing field," bonds for infrastructure development should either be all taxable, or all tax-exempt.[34]

Another remaining, though less prominent, barrier concerns the classification of wastewater facilities. The wording of the Resource Conservation and Recovery Act (RCRA) was based upon the differentiation between industrial and municipal plants, with the understanding that industrial systems were likely to handle and possibly discharge more highly hazardous constituents (or higher concentrations)

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33 Lisk, Ian, ed., "OMI Signs Agreement to Manage Utilities at DOE Facility," http://news.wateronline.com/BusinessWire/bw19980331-091461.html.

34 Poole (May 1995), p.15.

than municipal plants. More costly compliance standards were required for the industrial systems. The coined phrase "publicly owned treatment works" (POTW) has been interpreted by the EPA to apply to facilities 100% publicly owned. In their interpretation and application of discharge standards, a privatized system has been assigned the more costly requirements intended for industrial applications.[35] This has been a hindrance to privatization, and requires legislative action to ensure proper application of requirements.

Case Studies: Privatization in Action

Following are descriptions of two significant successes in wastewater privatization. With the proven track record of short-term privatization contracts, and consistent with the emphasis of previous discussions, the focus here is on cases involving two of the non-traditional opportunities, asset sales and long-term leasing.

Franklin, Ohio: Privatization Through Asset Sales

Background:

Franklin, a community of 11,000 near the Great Miami River is the location of the Franklin Area Wastewater Treatment Plant. The plant was originally owned by the regional Miami Conservancy District (MCD) which includes Franklin, Germantown, and Carlisle, and portions of Montgomery and Warren counties. Privatized contract operations of the plant began in 1987. In 1992 the private firm operating the plant offered to buy it for $6.85-million. Following a three-year negotiation and approval process, the sale was finalized. This was the first use of the provisions of E.O. 12803, and Franklin was the first city in the United States to privatize by asset divestiture.

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35 *Ibid*, p. 14.

Terms of the Agreement:

With the July 1995 purchase of the treatment facility for \$6.8-million, the private firm signed a twenty-year agreement which allowed for MCD repurchase at the end of the term if desired. All plant upgrades and expansions are to be financed by the private entity. In order to maintain classification as a POTW (and avoid increased requirements under RCRA), MCD remained as the owner of the collection system and a small part of the treatment process. The private firm's responsibility included the operation and maintenance of the treatment system , administration of the municipal industrial pretreatment program (MIPP), and regulatory reporting. A co-permittee agreement for NPDES requirements was agreed upon.[36]

Benefits to the Municipality:

A dramatic impact of privatization was a twenty-eight percent reduction in user rates, with any future increases tied directly to inflationary indices. The reduction was made possible primarily through the private firm's use of updated technology. In addition, the municipality was able to use the sale fee to retire outstanding local debt related to the wastewater system. The guaranteed rates provided for under the twenty-year agreement were attractive to businesses, resulting in significant economic growth. An interesting result of this growth was the requirement for increased capability in the domestic water supply and treatment system. With a successful background in privatization, a development franchise was agreed upon for the financing, design, construction, and operation of a new 5-mgd water treatment plant.[37]

Summary:

Through wastewater privatization, Franklin, Ohio was able to achieve a cash infusion, reduce rates, transfer responsibility, and stimulate economic development.

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36 U.S. EPA (July 1997).

37 Oldewurtel (April 1998), pp. 32-33.

Their ice-breaking initiative in the application of E.O. 12803 to asset sales was indicative of the potential benefits waiting to be reaped by other municipalities.

Cranston, Rhode Island : A Long-term Lease/Service Privatization Agreement

Background:

Cranston, a city of 78,000 near the capital of Providence, had contracted out the operation of its 23-mgd wastewater treatment plant since 1989 under a five-year agreement.[38] With a consent order requiring capital upgrades to tertiary treatment, and other significant municipal financing needs, the city council recognized the potential benefits of a long-term agreement for wastewater system privatization. Most attractive was the chance to integrate responsibility and control under one entity, along with the considerable financial benefits of long-term cost savings, and short-term payment of bond indebtedness. They also recognized the benefits of including system repair, rehabilitation, upgrade, and expansion in the privatization agreement. Once again, opening the door to this type of an agreement was E.O. 12803, which allowed municipalities to recover and utilize proceeds from an asset sale or long-term lease. Cranston was the first municipality to take advantage of the lease possibility.

City Goals:

A long-term leasing/service arrangement was the most applicable privatization possibility for Cranston, based upon its goals, which were:

-maintain ownership;
-refinance or defease wastewater system debt;
-fund capital requirements without direct municipal obligation;
-provide an infusion of cash;
-shift the risk for financing and developing future upgrades/repairs to a private entity.

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38 Reinhardt, William G., "Financial Close on Cranston, R.I., Wastewater Lease Puts $48 Million of Savings in City's Cupboard Now," *Public Works Financing*, September 1997.

Having already realized significant efficiency and cost improvements through contractual privatization, the city was ready to proceed further.[39]

Monetary Terms of the Agreement:

For the right to operate, maintain, and upgrade the wastewater system, in September 1997 the private company paid an upfront lease payment of $48-million to the city, and provided $28.5-million of tax-exempt construction financing for future needs. This financing for capital improvements was derived from private-activity bonds managed by the private firm with no recourse to the municipality. This was allowed under E.O. 12803 and took the weight of the financing responsibility away from the city. Under the agreement, the city/rate-payers provide contract service fees (about $230/yr/user).[40] Any increase in user fees are tied directly to the Consumer Price Index (CPI), thereby assuring steady rates (in real terms) over the twenty-five year contract.

Allocation of Responsibility:

Under the terms of the agreement the city maintained ownership of the wastewater system, and maintained the responsibility for billing collection and enforcement of the MIPP. The private firm assumed operation, maintenance, and repair responsibility for the 23-mgd extended aeration treatment facility, twenty-one pumping stations, force mains, 190 miles of sewer interceptors and remaining collectors. Included in the fixed-price contract was the private firm's responsibility to administer the MIPP, and finance, design, and construct all required improvements to the wastewater treatment system.

Benefits to the City:

The benefits to Cranston can be summarized as follows:

-Private sector participation saves city $76-million over 25 years;

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39 Lisk, Ian, ed., "A New Chapter in Public Finance: The Cranston, Rhode Island, Model," http://news.publicworks.com/case-studies/cs70402.html.

40 *Public Works Financing*, "Cranston Council OKs 25-Year Wastewater Deal," December 1996.

-Contractual assurance of compliance to state and federal regulations;
-$8.6-million in enterprise fund debts were paid in full;
-$25-million existing sewer related bond indebtedness paid in full;
-$6.9-million general fund deficit paid in full;
-$6-million general fund surplus created;
-Long-term capital and interest savings of over $100-million.

The long-term savings noted last are due to the private firm's $2.5-million solution of using fine-bubble aerators in existing tanks as part of the tertiary treatment requirements, rather than the previous recommendations of the city's consultant for providing a separate denitrification train at an estimated cost of $35-40-million.[41]

Performance Assurance:

The private firm provided a $1.5-million letter of credit, and a $3-million performance bond as surety. In addition, contract clauses allowed the city to immediately cancel the lease and service contract (without the typical cure period), if there were performance failures in areas of financing, permit compliance, and construction execution.[42]

Summary:

As a pioneer in the lease/service area of privatization, Cranston trail-blazed through the complex environment of opportunities for public-private partnerships, looking to go beyond the well-documented level of short-term contract operations, and pursue an agreement that included provisions for capital development and long-term management. A noteworthy provision of the agreement was the inclusion of the entire wastewater system (not just the treatment plant). Also significant, and groundbreaking in nature was the review and approval by the EPA and the Office of Management and Budget (OMB) in relation to leases under E.O. 12803. Through this agreement, the previously mentioned benefits of alternate sources of financing,

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41 Reinhardt (September 1997).

42 *Ibid.*

cost-effective design and operation, clear delegation of responsibility and risks, and guaranteed costs have been achieved. With a pattern to emulate, it is recommended and expected that other municipalities explore similar opportunities. Available future benefits and opportunities exist not only for municipalities, but for also for qualified private firms. The Cranston agreement paves the way for future business ventures, and has succeeded in creating a competitive environment for wastewater operations. An integral part of the process was the pro-active way the opportunities were marketed to the rate-payers. Through extensive public hearings, the potential benefits were presented in a way that got the citizenry behind the city's plan.

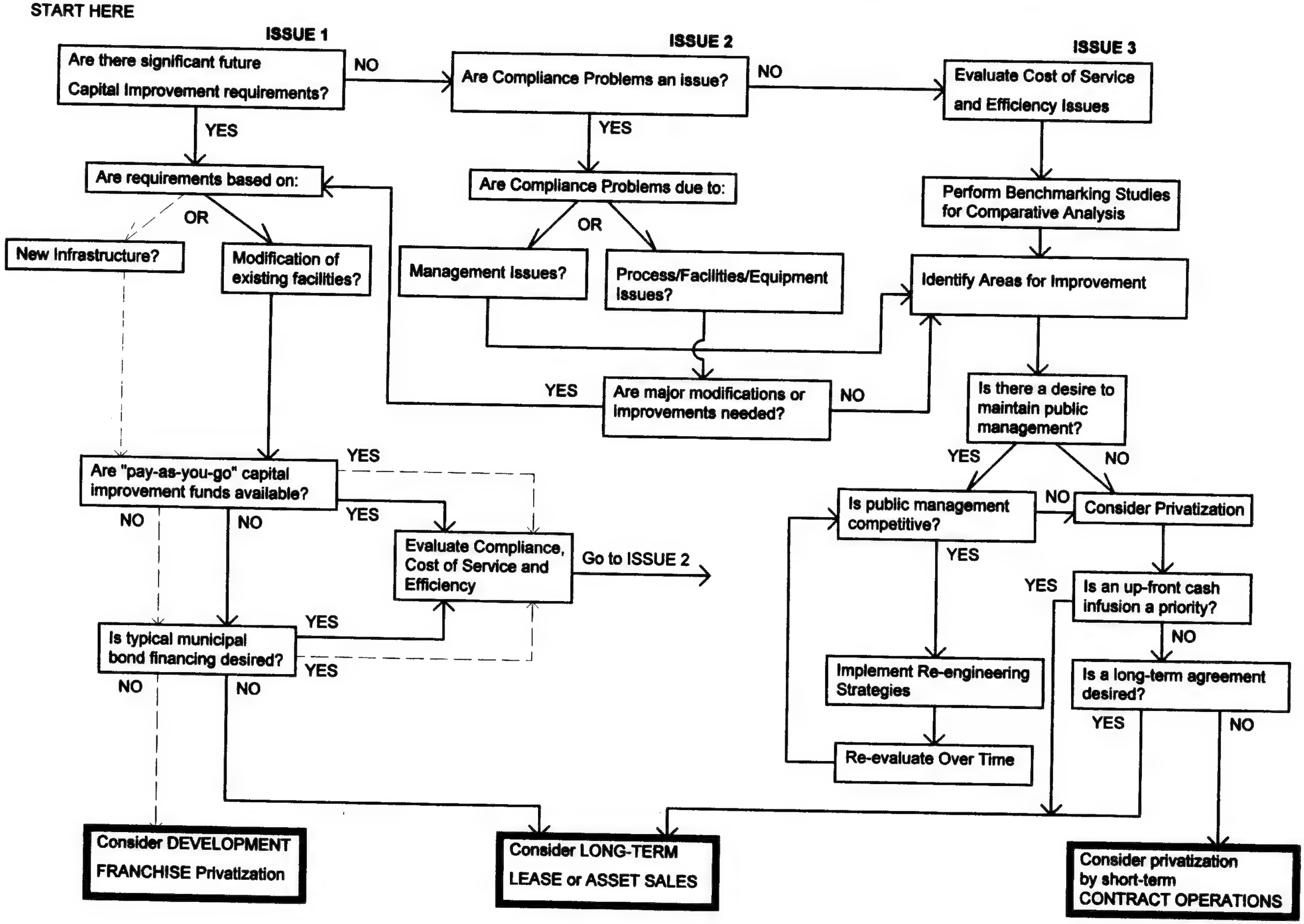
Issues and Processes in Municipal Evaluation of Privatization

With the potential benefits available, all municipalities should consider wastewater privatization. Due to the number of options and the complexity of issues involved, this consideration can seem daunting at first. The key is to start with a macro look at the needs of the municipality in relation to wastewater operations, and gradually refine the consideration as goals and objectives are defined. Figure 5 has been created to assist in "first-look" evaluation of wastewater privatization opportunities. The objective of this analytical aid is to provide a simplified logical analysis of a communities requirements and possibilities. The result should be a clearer understanding of which privatization options to explore in detail.

<u>Using Figure 5 - Preliminary Evaluation of Wastewater Privatization Options</u>

Consistent with earlier discussions, the primary issues behind the focus on privatization are related to capital development requirements, compliance, and efficiency. Different perspectives will put more emphasis on one issue than the other, but all three are vital considerations, and the underlying theorem in this analysis is that all communities must at least <u>consider</u> some form of wastewater privatization.

Figure 5 - PRELIMINARY EVALUATION OF WASTEWATER PRIVATIZATION OPTIONS



Granted, there are issues outside of this analysis which may preclude a decision to privatize, but prudent municipal officials must at least take this "first look."

Because of the tremendous infrastructure needs previously documented, the starting point for evaluation is Issue 1 - Capital Improvement Requirements. As shown, a decision is required regarding the extent and location of requirements. This dual-track evaluation is followed through to privatization options.

Issue 2 - Compliance Problems, considers regulatory and permit requirements. It requires an evaluation of whether problems result from "people" or "plant", and directs a further look at whether privatization should be part of the solution to these problems.

Issue 3 - Cost of Service and Efficiency, is a fundamental analysis required even if there are no capital improvement or compliance issues. Communities without significant requirements related to Issues 1 and 2 still need to evaluate the performance of their wastewater operations. While requiring considerable effort, benchmarking studies are essential to this evaluation. With the supposition that there is always room for improvement, the goal is to identify areas or issues to be targeted.

Critical to privatization evaluation is the consideration of whether or not a continuation of public management is desired. If it is, then re-engineering efforts are required based on the identified areas for improvement. One public entity which went through this process was the Hampton Roads Sanitation District of southeastern Virginia. A 1997 Benchmarking Study placed them at the top end of public plants, and competitive with already privatized plants. The analysis was based on comparison of twenty-two other regions, and included benchmarking of fifteen functional areas. As a result of this study, reengineering strategies were developed to further improve efficiency and operations.[43] For communities that do not have a

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[43] HRSD Treatment Department Benchmark Report, 1997. Received from Robert Rutherford, Plant Manager.

desire to continue public management (and even for those who do, yet don't have the capability of performing competitively), the next step is to evaluate privatization opportunities as shown on Figure 5.

Discussion of Reengineering

In wastewater operations, just like most public agencies and private firms, there is always room for improvement. An evaluation of paradigms, processes, and performance can often lead to improved efficiency through "reengineering". Usually it takes some sort of threat or outside pressure to require this kind of self-evaluation, but when it happens there are usually noticeable benefits in the form of increased efficiency, better service, and reduced costs.

There are a few examples of public entities which have won competitions for wastewater operations after effectively reengineering their processes. Two recent examples are the Martin County, Florida, Utilities Department, and Charlotte-Mecklenburg Utility Department (North Carolina).[44] Reengineering efforts for these municipalities centered improved efficiencies in the areas of labor requirements, process automation, material costs and usage, and energy costs and usage.

The Management Factor

Many process, cost of service and efficiency issues are related to management. Drawing from a British study in the 1980's, Brendan Martin stated in his book, *In the Public Interest,?* that this study "examined 'total factor productivity' of several British companies before and after privatization and concluded that change in culture and management methods rather than in ownership was the decisive

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44 Lisk, Ian, ed., "Water/Wastewater Utilities Win Own Competitions to Operate Their Facilities," October 11, 1996, http://www.pollutiononline.com/times/industry-news/ind10119602.html.

influence on changes in results [on] both sides of privatization."[45] A common agreement among those considering the privatization issue for wastewater operations is that the issue often comes down to whether or not a municipal system is operating poorly or efficiently. The purpose of including this consideration is to provide a balanced perspective showing that, privatization or not, efficient management is key to achieving optimal efficiency and performance.

Politics and Privatization

While this discussion has focused primarily on infrastructure, operational, and financial issues related to wastewater privatization, the unfortunate, yet realistic disclaimer of politics must be acknowledged. The history of privatization in other fields has shown that even when all the indicators point to privatization being attractive and doable, political feasibility can be the decisive factor. Wastewater operations do not have the political label that many other public services do, but just as trash-hauling became highly politicized in the 70's and 80's, wastewater is also headed down that road, primarily because there is significant money to be made in the industry. As most engineers and accountants know, the technically desirable or cost-effective solution may not be selected because it is not the "politically correct" solution. However, as both Cranston, Rhode Island, and Franklin, Ohio discovered, public inclusion in the evaluation process, and a breaking down of preconceived notions can lead to both political and public support for privatization efforts.

Summary and Conclusions

Wastewater privatization is an area of largely untapped potential. With looming infrastructure expansion and improvement requirements, public demand for

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[45] Martin, Brendan. *In the Public Interest? Privatization and Public Sector Reform*, London: Zed Books, 1993, p.140.

cost-effective service performance, and increasing demands of regulatory compliance, public-private partnerships offer potential benefits in all three areas. Recent executive direction and tax code changes, coupled with groundbreaking efforts of progressive communities, have opened the door for continued success. Each community must assess its current status and future requirements, and then evaluate which options to consider. Non-traditional types of privatization such as asset sales, development franchises, and long-term leasing, offer benefits covering the entire scope of wastewater operations, but have not been exploited to their full potential. In order to achieve the common desire for environmental quality and public health protection, public-private partnerships must be considered for municipal wastewater operations.

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